After the War!

WITH the tremendous load imposed on our streets and highways by the exigencies of the present armament program, the traffic engineer has his hands full keeping congestion at a minimum and in combating the rising accident rates. However busy he may be, it is necessary that he look ahead to the time when hostilities will cease and our efforts will be switched to peaceful production. Already the Federal Government is setting up plans for combating the business and employment slow-up which in the past has quickly followed the armistice. It is up to the traffic engineer to survey his field and to determine what steps he should take to protect the vast transportation system for whose smooth operation he is responsible.

Undoubtedly we shall come out of this emergency period with expanded facilities, at least in some regions. However, there will also be many ways in which streets and highways will be in worse condition than at present. For one thing, there is bound to be more actual damage to the roadway because of increased army and civilian traffic. Furthermore, even normal repairs, to say nothing of normal improvements, are becoming increasingly difficult to make because of scarcity of materials. To this depreciation of many miles of present roadways will be added the factor of increasing average age of automobiles and trucks using the roadways. This may or may not adversely affect accident rates, but it will undoubtedly affect the economy of automotive transportation. England has already found it necessary to ban average vehicles from her roads. When it is again possible to buy new cars in quantity, we can expect technological advances to have brought about a vehicle which is a renewed challenge to the traffic engineer.

After the war, highway building will undoubtedly be one of the public works projects which will receive monetary encouragement as a cushion to unemployment and cessation of armament building. If the traffic engineer has his plans laid properly, he should be ready to take advantage of the opportunity to obtain worthwhile traffic improvements and to assist in fitting design and location to known traffic requirements.

Edward J. O'Meara

Member, Board of Direction

VOLUME XII DECEMBER, 1941 NUMBER 8

PLAN FOR IMMEDIATE IMPROVEMENT OF DEFENSE PRODUCTION TRANSPORT

by HON. CLIFFORD DAVIS

of Tennessee in the House of Representatives, October 30, 1941

MR SPEAKER, the importance of efficient highway transportation is obvious to any who will give the matter study. Nevertheless, serious street and highway transportation problems have already arisen in many places. The main troubles which decrease the efficiency of highway transportation are delays, congestion, and accidents. In many places I have witnessed serious, if not critical, delays and congestion and the records clearly show a serious increase in our traffic-accident toll. In fact, highway fatalities are up nearly one-fifth over the toll for the similar period of last year.

Already these problems of highway transportation are causing serious concern to municipal, county, and State officials, especially, of course, in the metropolitan areas and in the vicinity of defense plants and military establishments. What these conditions will be when our productive capacity reaches its peak I do not wish to visualize, for they can have a most serious effect on our defense program. They will have such an effect unless strong corrective steps are taken promptly. For the most part, these steps must look to the better use of the highway facilities we now have. This does not mean forgetting the highway improvements and future developments which are sorely needed, but it does recognize the urgency of our productive effort.

Motor vehicles are our major media for transporting people. In fact, outside of municipalities, there are some 10 passenger-miles by motor vehicles to one passenger-mile by other modes of transportation. Not only is our Army mainly transported over highways, but on my recent trip over a large part of the West and Middle West, visiting defense plants, I saw case after case where plants simply could not be operating in their present location without motor-vehicle transportation for their workers. Seventy percent of workers in car-owning families are said to go to work by automobile.

The wheels of American factories are turning faster and faster, as we move out of the planning and blueprint stage into the period of all-out production for defense and for aid to the embattled nations opposing aggression. Soon our mighty nation with the greatest productive capacity in the world, will be reaching new heights of production, with vast new floods of materials marking new goals of industrial achievement. We have set ourselves to produce the needed matériel and supplies, and produce them we will. Peacetime businesses and our citizenry are making great sacrifices in order that our production objectives may be quickly achieved.

Much attention has been devoted to organizing our economy, indeed, our very way of life, so that factory and plant production will be expedited to the maximum degree which our excellent manpower, ingenuity, and driving force can make possible. However, in our concentration on increasing production, we have, to a serious degree, neglected an equally vital part of the job we have to do. Efficiency in transportation is also essential if we are to use our shops and factories to maximum capacity and if the finished goods are to reach their destinations on time.

All kinds of transportation are necessary—water, air, rail, and highway. Each has its important part to play, and each must do its part as a member of a great transportation team. The seriousness of transportation trouble has recently been most clearly brought out in the discussion of the gasoline- and oil-shortage problem of the eastern section of this country. At this time I wish to direct attention, however, to that kind of transportation which in many ways is the most important in our defense effort. I refer to highway transportation.

It seems unnecessary to enlarge upon the importance of highway transportation in this nation which is so much the birthplace and home of the modern automobile. Our 45,000,000 drivers operate 32,000,000 motor vehicles, and some 300,000,000 vehicle-miles per year over 3,000,000 miles of roads and streets. Our Army has become motorized — and with over a quarter million motor vehicles, our Army operates the largest vehicle fleet in the world.

While our magnificent railroad systems carry much greater ton-miles of freight, over 65,000 motor vehicles are used by the railroads in the assemblage and delivery of much of that freight and in other phases of their business. Trucks act as feeders to rail transport in many vital ways. Moreover there are some 48,000 communities in this country with a population totaling some 8,000,000, which are served only by highway transportation. Furthermore, in the handling of certain important materials vital to our defense activity, the motor vehicle is the logical and principal transportation medium.

Realization of the vital importance of highway transportation by leaders in our Government resulted in the development of a 75,000 mile strategic network of highways of major importance from a military point of view, and of plans for giving priority to the improvements of certain weaknesses in this network, such as lack of adequate shoulders, weak and narrow bridges, and certain deficiencies in roadway width, and to emphasis on over 3,000 miles of access roads to almost 400 military and naval reservations, airports, arsenals, defense industries, and so forth. These matters and the financing of the necessary improvements are covered in H. R. 5810 as well as flight strips, certain provisions for off-street parking and other related matters such as acquisition of needed rights-of-way for important improvements.

Unfortunately, not enough attention has been given to securing maximum efficiency of highway transportation. Seriously concerned about this situation, the Institute of Traffic Engineers has devised a plan which has my hearty endorsement. This institute is a professional engineering society, made up of those engineering specialists who are devoting their energies to solving problems concerning the use of highways through the gathering of facts and use of the scientific approach to the problem. They are men who believe that problems of traffic will yield best if the key facts are obtained and solutions are designed in light of what those facts show and mean— and not on the basis of the "hunch" or belief or viewpoint of any person or group of persons.

This professional group was organized in 1930 and now includes most of the practicing traffic engineers of the country. At its annual meeting in Chicago on October 7, 1941, the outline of a plan for immediate improvement of defense production transport was unanimously adopted. It is of such intrinsic value that I desire to present it and have it reproduced in the RECORD for the benefit of communities throughout our land. I give it my wholehearted endorsement.

It has been submitted to the Na-

tional Traffic Advisory Committee to the War Department, and I believe it will prove a stimulus to greater activity which will improve the efficiency of our highway transportation system very greatly in the months and years ahead.

The outline of the plan is as follows:

A PLAN FOR IMMEDIATE IMPROVEMENT OF DEFENSE PRODUCTION TRANSPORT

(By Institute of Traffic Engineers, New York, N. Y.)

Congested highways are sabotaging the defense efforts of the United States.

Our streets and roads represent a critically weak link in the production line of national defense.

It is wasteful to spend millions of dollars for national defense unless we can speedily move raw materials to factories, transport workers to plants as quickly as possible, and deliver the finished products before it is too late.

Highway congestion is critical today. But when the defense program moves into full production, conditions on our highways will become intolerable in many areas unless we achieve the maximum use of existing facilities. This will mean less congestion and fewer accidents.

The Institute of Traffic Engineers therefore recommends the following steps as a must program in the interests of national defense:

1. We must plan routes for defense workers and trucks;

2. We must reduce peak-hour congestion through staggering employment hours in defense areas; and

3. We must eliminate traffic bottlenecks.

The Institute of Traffic Engineers therefore recommends that the National Traffic Advisory Committee to the War Department urge each State, county, and city to cooperate in carrying out the Institute of Traffic Engineers plan toward accomplishing these objectives in places where the need exists.

This plan can cut defense traffic delay as much as 50 percent in many places.

I. Plan routes for defense workers and trucks.
   - A. Establish preferential routes for:
     1. Employees.
     2. Trucks.
     3. Mass transportation.
   - B. Bypass congested areas:
     1. Relocate numbered routes.
     2. Provide alternative bypass routes.
   - C. Establish through (stop) streets.
   - D. Establish one-way streets.
   - E. Resurface and repair streets.

II. Reduce peak-hour congestion in defense areas by:
   - A. Staggering working hours.
   - B. Encouraging civilian traffic to avoid travel during rush-hour periods.

III. Eliminate bottlenecks:
   - A. Control or restrict curb parking and loading and provide off-street facilities.
   - B. Channelize traffic for orderly movement:
     1. Lane marking.
     2. Islands.
     3. Intersection redesign.
   - C. Install and modernize traffic-control devices:
     1. Signals.
     2. Signs.
     3. Street marking.
     4. Street lighting.

This plan can be applied quickly and economically and if properly applied will provide maximum efficiency from the present system. There are other important new projects which are more costly and take longer to accomplish, but in instances are less costly and more practical than erecting temporary cities near temporary plants. Among these are express streets and highways, grade separations, and the control of roadside development, which are of peacetime as well as defense value. These should be planned now.

SEASON'S GREETINGS
TO OUR READERS

VISUAL AIDS TO TRAFFIC MOVEMENT UNDER BLACKOUTS

by W. S. EVERETT AND KIRK M. REID

STUDIES of visual aids to traffic movement under blackouts were conducted at Moreland Hills, Ohio. The findings are reported and discussed, in comparison with European specifications on Air Raid Precautions lighting. Preliminary tests were also made of the efficacy of brightness camouflage in concealing military objectives and permitting more nearly adequate lighting for traffic movement.

The studies were made under the direction of the Army Engineer Board, in cooperation with the Nela Park Engineering Department of the General Electric Company.

The test area, 1,000 ft. square along U. S. Route No. 422, was approximately in the center of the blackout area. The pavement was of worn concrete, with a reflection factor ranging from 15 to 20 per cent. The reflection factors of the adjoining fields, a pond and woods were estimated to be 7 per cent, 6 per cent and 4 per cent respectively.

The observations on the nights of July 1-2 and July 2-3 were made in four Army observation planes of the 103rd Observation Squadron, flying at 150 to 200 m.p.h. Each night there were ten observers—two each at 2,500 ft. and 10,000 ft., and three each at 1,000 ft. and 5,000 ft.

All tests were made after the setting of the moon and carried through until dawn—approximately 12:30 A.M. to 3:50 A.M. The average road illumination from sky light was 0.0002 (20×10^{-5}) FC. A. H. Taylor developed an ingenious photometer for measurement of low brightness. With this instrument the photometrist views the test field directly through a tube, and balances the test field against a comparison field whose image is seen in a mirror projecting within the tube at one side.

The British and German military authorities approve blackout street lighting and headlighting of an order which apparently can be seen under favorable conditions at altitudes under 5,000 ft.

The altitude from which ground areas are visible under favorable atmospheric conditions depends upon their area and brightness.

Street Lighting. It was strongly impressed upon the ground staff that blackout illumination levels, although permitting pedestrians and vehicles to proceed cautiously, provide such low visibility that anything approaching normal traffic movement is impossible. Against the protection from aerial attack gained by these low levels, therefore, one must weigh very considerable losses. One of these losses is depressed civilian morale and efficiency. Another is the inevitable increase in traffic fatalities, personal injuries, and property destruction. And along with this increased hazard there is the slowing down of defense activities caused by sharply reduced speed of transportation of material, labor, military equipment and personnel.

Indeed, it should be remembered that except at times of imperative need the most efficient functioning of the whole defense effort requires on most of our streets and crowded highways not less but more adequate lighting, in common with other means for safeguarding and facilitating traffic. This is particularly true in America where large numbers of private vehicles, rather than public transportation facilities, must be relied upon for mass movements of workers and others.

The desirable blackout street lighting system, therefore, would appear to be one which supplements rather than replaces the normal street lighting. Upon receipt of an air raid warning the normal street lighting would then be turned out and the blackout system turned on. Or, since the wattage of the blackout street lighting would be very low, it might even be found most economical of men, materials and money, as well as most expeditious, to connect the units to available multiple circuits and burn them continuously without switching provision.

Available data and aerial observation experience appear to provide a sufficient basis for preparation of American blackout street lighting specifications. The British specifications provide an acceptable general pattern, probably with certain modifications relating to such items as desirable asymmetric distributions and color of light.

Vehicle Lighting. The authors understand that it would be relatively easy to design and build masks for existing standard headlamps which would provide beam candlepowers and distribution similar to those used abroad. Beams of still lower candlepower could best be provided by an especially designed alternative lamp which would be used when needed instead of the standard headlamp. With such headlamps of very low candlepower, speed of travel would be increased by use of efficient reflecting delineators activated by a unit with a beam of shallow fan form.

Eyeball fluorescence, produced to a slight extent by an incandescent UV headlamp and to a marked extent by a mercury UV headlamp, causes annoyance and loss of dark adaptation to pedestrians and oncoming drivers. Hence the desirability of ultraviolet headlighting is to be questioned on roads which carry two-way traffic or are used simultaneously by vehicles and pedestrians.

The European specifications on blackout vehicle lighting, as well as street lighting, traffic signs and signals, are summarized in the Appendix.

Color of Light. Past researches have established certain facts which may be relied upon for guidance in selecting sources best adapted to blackout conditions:

Foveal dark adaptation (cone vision) is precipitous for the first few seconds and is substantially complete within 5 minutes. Conversely, peripheral adaptation (rod vision) is relatively much more gradual and is not substantially complete for half an hour or more.

Dark adaptations of the rods is far less affected when the eye encounters red radiation than when it is exposed to blue. Objects and luminous patterns seen on the street at distances of 20 feet or more can be brought into sharp focus by most observers with red illumination but not with blue.

For very low values of illumination at the eye, red is the only color that persists as a distinctive hue. Whites, yellows, blues, and greens all tend to merge.

With weak colored illumination the fovea is more sensitive to red flicker and the periphery to blue flicker.

Therefore, it may be said that for the same values of headlamp candlepower or street illumination, red light serves best to facilitate ground activities and is at the same time least likely to be detected from the air. The rapid dark adaptation under red light is its important advantage, because pedestrians and drivers of vehicles are less likely than aviators to have the benefit of a long period of dark adaptation. The disadvantages of red are its slightly greater atmospheric transmission, and the relatively small amount of peripheral vision it provides.

A limitation in the degree of peripheral vision is, of course, a handi-

cap and a hazard in both vehicular and pedestrian movement. Hence the use of white light for headlamps and street illumination is a compromise which may well be warranted for many situations. Whatever departure there is from white, however, should be in the direction of red rather than blue. Yellow, for example, may well be investigated.

It is noteworthy that red radiation does not *interfere* with the peripheral vision which a dark-adapted observer obtains from moonlight, starlight, vehicle marker lights, and pedestrians' flashlights. If such marker lights and flashlights are blue or bluish-white the maximum peripheral pickup is obtained. A blue-marker light, of very low CP properly directed, might serve the further purpose of supplementing red headlights by contributing general road illumination which would become discernible to the driver after 15 to 30 minutes of dark adaptation.

APPENDIX—Following is a summary of the British and German A. R.P. specifications, and to a limited extent those originally set up in France and Holland, on visual aids to traffic movement:

STREET LIGHTING

Horizontal illumination at road level. British—20 x 10^{-5} FC average, 40 x 10^{-5} FC maximum.

German—80 x 10^{-5} to 100 x 10^{-5} FC average, 1000 x 10^{-5} FC maximum over limited area.

French—15 x 10^{-5} FC average.

Dutch—50 x 10^{-5} to 70 x 10^{-5} FC average.

Candlepower distribution of luminaire. British—Zero CP above 85° from nadir. Limits of CP distribution for nominal mounting heights of 10, 15, and 20 ft. shown in Fig. 4. CP verification tests to be made in laboratory; field measurements limited to rough checks with low-illumination gauges. Luminaire design such that minor variations in source position have minimum effect on CP distribution.

German—Zero CP above 85°. Maximum CP not more than 5 times minimum CP within 65° of nadir.

French—Zero CP above horizontal.

Dutch—Zero CP above horizontal.

Spacing and mounting height. British—Spacing at least 100 ft. Reduced CP or higher mounting for spacing less than 100 ft.

German—Spacing 180 to 240 ft., recommended mounting height 24 ft.

Light sources. British—White light, from normally operated gas mantles or filament lamps at approximately rated voltage.

German—Low-lumen lamps preferable to higher-lumen lamps at reduced voltage or masked.

French—Neon lamps, or filament lamps with bulbs largely opaqued and translucent area tinted orange or blue.

Dutch—Filament lamps at reduced voltage with bulbs partly opaqued and blue lacquer on translucent portions to produce "white" light.

General requirements. British—Rigid mounting. Screens to shield light from nearby water. Lighting columns and nearby surfaces to be painted black. White paint recommended on vertical surfaces of kerbs at crossings and on walls, railings, etc., where useful in aiding pedestrian or vehicular traffic.

Limited street lighting of higher intensity. British—None permitted.

German—15-watt shielded lamps 24 ft. high permitted under special circumstances (not explained) if instant switching available.

French—Lighting above blackout level permitted for essential purposes if instant switching available.

MOTOR VEHICLE LIGHTING

Headlamps. British—One conventional headlamp, emitting "white" light, masked to the following candlepowers:

(*Editor's note*: British are changing to two masked headlamps.)

German—One special "concealment headlamp," 0.8 to 1.2 meters above roadway at middle or left of vehicle, emitting "white" light.

Rear lamps and side lamps. British—Circular aperture not exceeding 2" dia., covered by two sheets of newspaper or equivalent in paint, 7 watts max.

German—Conventional rear and stop lamp, brightness adjusted to be visible as four spots of light up to approximately 25 yds., as 2 spots at approximately 50 yds., and as 1 spot beyond 100 yds.

Stop signals and Direction (turn) indicators. British—Brightness restrictions as for rear lamps.

Vehicle—interior illumination. British—Public transportation vehicles only permitted interior illumination visible from outside, with the following restrictions:

Lamp bulbs shaded to be invisible from outside

Maximum seat illumination 0.1 FC

Maximum illumination on ground outside vehicle 0.001 FC

Lights extinguished immediately on air-raid warning.

Exterior painting. British — Matte white paint required on bumpers and edges of running boards.

TRAFFIC SIGNALS AND SIGNS

Traffic Signals (stop-and-go). British—Standard traffic signal masked by opaque disc having an aperture, within upper half of signal face, in form of vertical cross with arms 3" x 1/8".

Traffic direction signs. British—"Keep left" sign, St. Andrew's (diagonal) cross. White arms 4" x 1/2", maximum brightness 1.5 FL, hooded. "Fog flares" along road, when needed and approved by local chief officer of police, with provision for immediate extinguishment.

German—"Pilot" signs, one luminous strip 6" long to show street direction or two luminous strips with second perpendicular to and 4" below first to mark crossings. 0.25 maximum CP between 90° and 95° above nadir, hooded.

Location signs (refuges, fire stations, etc.). British — Panel 12" x 24", hooded, black background with lettering sensibly white both day and night. Average letter brightness 0.04 to 0.1 FL, ratio maximum to minimum not over 15 and ratio at centers of adjacent 3" x 3" squares not over 3.

German—"Pilot" signs with two strips used to mark refuges.

Obstruction markers. British—Red source not exceeding 1.0 CP, hooded.

A paper presented at the Convention of the Illuminating Engineers Society, Atlanta, September, 1941.

W. S. Everett Captain, Corps of Engineers, Engineer Board, Ft. Belvoir, Virginia, and K. M. Reid (Affil. I.T.E.), Nela Park Engineering Department, General Electric Company, Cleveland, Ohio.

STAGGERED HOURS

by U. S. CHAMBER OF COMMERCE

STAGGERING of business hours as a means for relieving rush-hour traffic congestion and the over-burdening of transit facilities is already in successful operation in many localities and is being widely considered for more extended application.

Thus far only in relatively few instances are staggered hours the result of concerted effort, but the serious conditions of street and highway congestion and overburdening of street cars and buses in many localities, due to the defense effort, have drawn attention to the staggering of working hours as part of a program to relieve these conditions.

Within cities and at large plants on rural highways the shortage of roadway capacity has created serious impediments to the defense effort. The authorities are actively pushing new construction and enlargement of existing facilities, but the possibilities of relief in these directions are limited because of the time necessary for such work, and it is essential to make better use of existing facilities.

A comprehensive program of remedial measures that can be immediately applied for traffic and transit relief has recently been outlined by traffic engineers and defense authorities. While including recognized traffic improvement measures, such as rerouting of traffic to avoid points of congestion and efficient control of traffic by signs, signals and police officers, the chief new feature in the program is the staggering of working hours, which offers one of the most promptly available and effective measures for traffic and transit relief in many situations.

The chief advantages of staggered hours are as follows:

Assistance in providing relief from congestion on the streets and highways and on mass passenger transportation vehicles.

Help in speeding up traffic and avoiding delays to workers in industrial and commercial plants and offices and to employees and patrons of mercantile establishments.

Better adherence to schedules by street cars and buses, with consequent more uniform spacing and loading.

Economy in transit equipment, personnel and power, all urgently needed for other purposes in the emergency.

Protection of health through avoidance of overcrowding.

Improvement of safety conditions.

Staggering of hours has in a number of cases been found to reduce the morning and afternoon traffic peaks by 10 to 30 per cent.

There are three distinct ways in which the staggering of hours can be applied: First, to departments or groups of employees within any individual establishment, whether located in the heart of a city or in the open country; second, to different establishments in a given area of traffic congestion, such as an industrial, commercial or business-office section of a city; and, third, to different categories of traffic, such as industrial, office, school, shopping and theatre. For convenience the first type can be referred to as intraplant, the second as interplant and the third as interindustry staggering.

Intraplant Staggering: A few examples of intraplant staggering will illustrate arrangements of this character.

An electrical equipment manufacturing plant employing 20,000 which for many years utilized a two-group staggering plan with hours from 7 to 4 and 8 to 5, has now adopted a three-group plan with 30 per cent of the

employees quitting work at 3 p.m., 30 per cent at 4 p.m. and 40 per cent at 5 p.m.

A shipbuilding plant has staggered the day shift of its 25,000 employees to the hours 7 to 3:30, 7:30 to 4 and 8 to 4:30.

Interplant Staggering: The simplest form of which, is that applied to two adjacent establishments dependent upon the same transit and traffic facilities.

In a New England textile center the mills arranged to open at three different hours—seven mills at 6 a.m., six at 7 and three at 8. The high schools also opened at the latter hour and the stores at nine.

In a Pacific northwest city, with residential and industrial areas on opposite sides of the central business district, through which the topography necessitates passage of a large percentage of the 60,000 workers traveling daily to and from the industrial district, arrangements are being made to stagger the opening and closing or shift-change hours of industrial plants. A large airplane factory in this city with more than 10,000 employees has already set its day shift one hour earlier than those prevailing in most of the other industries.

Interindustry Staggering: A large proportion of existing staggering of hours is of an interindustry character and has come about over a long period of years through the natural process already mentioned. Thus factories commonly open at 8 or earlier, business offices at 8:30 or 9 and retail stores (other than food stores) at 9 or 9:30, with closing hours similarly distributed between 3:30 and 6. Reports indicate, however, that in general such interindustry staggering is far from having reached its full development and that existing traffic peaks in the business districts of many cities can be substantially reduced by adjustments and refinements of interindustry staggering.

The most systematic staggering of hours on record was that put into effect on order of the Commissioner of Health of New York in the fall of 1918 and again in January, 1920. The schedule of closing hours was as follows:

Stores (excluding food stores)—4:00 p.m.

Wholesale and shopping establishments —4:15 P.M.

Textile manufacturing plants — 5:00 p.m. (unchanged)

Non-textile manufacturing plants — 5:30 p.m.

Offices—5:30 p.m.

Theaters and movie houses were required to stagger their opening hours from 7 to 9 p.m., instead of the previous 8 p.m.

Schools: In many cities traffic to schools, particularly high schools and vocational schools, which are usually beyond walking distance for most of their pupils, is superimposed upon the morning rush-hour peak. To avoid this the school opening hour in some cities has been made a half hour later (9:30 instead of 9). In other cities reports indicate such a change would substantially ease the transit and traffic problem.

Washington, D. C.: A special situation with difficult traffic and transit features has for several years existed at the National Capital, and early this year staggering on a large scale was put into effect.

The number of government workers had already increased from 134,000 in June, 1940 to 162,000 in February, 1941 and it was estimated that there would be 218,000 by the end of 1942. Nearly half of the government force started work at 9 and stopped at 4:30 and a larger part was compelled by the location of their offices to pass through the congested central business

district, encountering additional volumes of privately employed workers. Thus serious transit and traffic problems had arisen, making imperative some form of relief.

On March 31, 1941, shifts were made in the working hours of many departments of the government. The various 15-minute periods before and after the change. Before the change 81,000 began work at 9 and 85,000 finished at 4:30. After the change there were several peaks morning and afternoon of about 40,000 each.

By the change the morning peak of vehicular traffic at nine key points was reduced 16 per cent, while that on one of the main street car lines was reduced 22 per cent. The afternoon peak showed a reduction of 11 per cent in vehicular traffic and a 27 per cent reduction on one major transit line.

Plans for staggering may vary from the simplest, involving only one or two establishments, to the most complicated, embracing a whole city or section of a city.

With respect to new or expanded plants, particularly outside of cities, plans for handling the traffic will usually involve roadway improvements, parking facilities, signs, signals and special regulations.

In a manufacturing city in the middle west the method adopted for working out staggering of hours has been through a committee representative of all interests so set up as to have the necessary practical knowledge of the feasibility of different staggering arrangements.

In larger cities, especially when considerable areas and numbers of establishments are involved, some form of organized survey is usually essential.

In the Pacific northwest city already referred to, the staggering plan was worked out from a survey of the hours of industrial plants and offices made by the junior chamber of commerce. A committee of that organization, with the cooperation of other agencies, including the transit company, is promoting understanding of the plan through personal contact with the larger employers, radio and forum discussions and the press.

In the large midwestern city mentioned, where the size of the area under consideration, its relationship to the central business district, and the number of establishments involved called for thorough technical study, the engineering staff of the transit company made the survey and developed a plan. According to recent information the managements of more than 60 per cent of the plants in the area have agreed to participate in the plan.

The survey covering the main business district of an eastern metropolitan area of a million and half population, with 80,000 people entering the district during the 8-9 a.m. rush hour, has been handled as follows: To get a representative sample of the travel habits of people commuting into and out of the district, arrangements were made to have a sample questionnaire filled out by each of 15,000 employees of four department stores, a large steel company and a large utility office, showing time of starting and finishing work and means of transportation used by each individual in daily travel. The working hours of other companies with about 60,000 employees were collected by the chamber of commerce. All this information, when tabulated, will be used to work out the best methods of staggering, whether by a shift of the hours of an entire industry, such as the department stores, or by changing the hours of employees engaged in certain activities, such as the accounting work, of a sufficient number of establishments to provide the requisite total shift, or by a combination of the two methods.

In working out staggered hours by

zones or sections of a city, care is required to see that peaks of traffic passing through more than one zone do not coincide, thus making conditions worse. Such difficulties can be obviated by proper planning.

Where staggering on a large scale is contemplated competent organizational and educational effort is generally necessary to overcome misunderstandings, bring out the advantages to all, and meet valid objections regarding details.

In development of staggering plans on a smaller scale, involving single establishments or a few acting together, the public relations problem is usually simple and can be dealt with by cooperation of the plant managements, their employees and the local traffic and transit officials.

A digest of a pamphlet published by the Transportation and Communication Department of the Chamber of Commerce of the United States, Washington, D. C., September, 1941.

TRAFFIC AND PLANNING ENGINEERING

by H. A. FLANAKIN

THE question ever arises whether or not there should be a single division in the highway department to administer the functions of highway planning and traffic engineering.

Indeed there is little precedent upon which to base judgment; however, engineers are not too dependent upon established customs for their actions. If sound reasoning and the principles of mathematics and the physical sciences are satisfied, the engineer is ready to go ahead with the project whether it has been done before or not. Planning engineers generally contend that traffic engineering is a function of planning, while some traffic engineers hold that planning is a function of traffic engineering. A third group declares that the two functions are no more related than oil and water.

Hardy Cross in 1940 defined Civil Engineering thus:

> PLANNING for the use of LAND and for the control and use of WATER and DESIGNING and CONSTRUCTING works necessary to carry out the plan.

Thomas Tredgold in 1820 defined it as:

> The art of DIRECTING the great powers in NATURE to the USE AND CONVENIENCE of MAN.

From these then, a planning engineer may be defined as:

> A CIVIL ENGINEER who is as concerned over the RELATION of the MACHINE TO SOCIETY as he is in MAKING IT RUN.

A highway planning engineer is one who is concerned with fitting the highway into the needs of society. His concern goes far beyond the mere bounds of the right of way lines. To him the highway is simply a means or a machine which when functioning properly will perform a useful service to man. But he is just as much concerned over the internal workings of the machine as he is over its place in society. The ultimate purpose of state highway planning is to develop a thoroughfare plan for the state highway system which harmonizes with the Master State Plan and to set up a long-range program of improvements or stage development of this system which in turn fits into the State Long-term Capital Budget. The first recommendations to the highway engineer should indicate the mileage of roads that are needed to serve the desires of the people. The next recommendation should indicate the routes or portions of routes to be included in future programs of improve-

ment. Recommendations of policy to be established in the selection of improvement programs should also be made, as well as recommendations of surface types best suited for particular locations. All of these recommendations should be substantiated by facts from the multitudinous data collected in surveys and studies.

In addition to this long-range thinking or prevision the highway planning engineer must needs secure and analyze facts to be used in the day-to-day problems which are so perplexing to highway engineers and highway administrators.

Traffic engineering may be defined as the science of moving traffic and the art of applying information collected in surveys and studies to the end that provision will be made in the highways for the attributes of perfect motorways; namely, speed, comfort, safety, economy and convenience. This involves expediting of traffic movement and promotion of safety by improvements in control and regulation of street and highway traffic as well as terminal facilities together with cooperation in the improvement of traffic law enforcement and traffic and safety education. It may be said, then, that the structural engineer is concerned with the ability of the facility to *support* the load from the surface down, while the traffic engineer's interest is whether or not the facility will *carry* the load from the surface up.

Research discloses that surveys and studies made by both the highway planning engineers and traffic engineers are:

1. Physical inventory
2. Traffic surveys
3. Economic studies
4. Accident studies
5. Vehicle performance and driver behavior

Except for turning movements in traffic volume counts and accident studies the highway planning engineer collects more detail in each of the studies listed. Practicing engineers (both traffic and highway planning) were asked to define their functions. When an analysis was made of the several definitions the list showed them to be similar in their fundamentals. So similar were the basic factors of the definitions that a logical conclusion follows that the common problem is *highway transport;* and what is now generally considered two functions is in reality only one, and could be integrated into one functional unit, on a parity with construction and maintenance, directly responsible to the state highway engineer.

Leaders in the field of public administration are agreed that there is an optimum number of departments. If there are too many it becomes impracticable for one man to supervise them properly. If there are too few the head of the organization must endeavor to be an expert on too many subjects. In general there are two pulls, one amateurish and political, which demands a large number for obvious reasons. The tendency for professionals and research workers is in the opposite direction. The consensus is that there should be from six to nine departments in city government and that a state government should have from twelve to fifteen administrative divisions in order to achieve the proper functionalization.

In a paper describing the model organization for a state highway department, G. Donald Kennedy, State Highway Commissioner of Michigan, recommends that there be six principal divisions under the chief engineer. In commenting on the number of divisions he says:

"In practically all of the states specialized functions necessarily add to

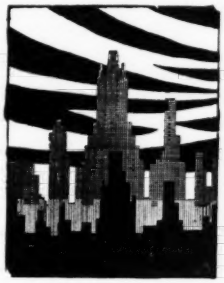
the principal functions of the organization. Many of the states, however, have gone a step further and added a considerable number of minor functions to their organization plan. Organizations tend to become cumbersome and unwieldy under this influence. A determined effort should be made to keep the organization setup simple and to place minor functions under major divisions."

Perhaps if one analyzed the reasons for the bi-functional operations of a single unit, it would be found that the human equation is largely responsible. Early highway departments had little concern over anything but construction problems. Man's ambition to overcome time and distance led the highway engineer from the simple problems of mechanics into the complex social order of today. Each new development in the field of highway engineering created another expert. Each expert being above the average of intelligence and of a strong character demanded another staff position in the department to carry out his work. It was thus that maintenance, soil mechanics, roadside improvement, bridges, right-of-way specialists and scores of other technicians came into being and created an apparent need for additional staff positions to expedite these specialized functions.

Highway departments were more or less forced into the field of planning in order to participate in federal aid under terms of the Hayden-Cartwright Act of 1933. Few highway administrators seemed to realize the potentialities of such a program and accepted highway planning as somewhat of a necessary evil. Highway planning surveys, started in 1936, were guided largely by the Public Roads Administration. Most of the money for these surveys came from PRA and there was a natural tendency on the part of that agency to object to the surveys being tied into some established functional division of the highway department. Although some states had established traffic engineering departments at the time of the organization of the planning surveys, Iowa, Massachussets and Oregon seem to be the only ones which integrated all of the functions into one operating unit. Since 1936 Florida, Louisiana and Maryland have joined in and combined all "minor functions under (one) major division." Florida, Illinois, New Hampshire and Vermont have transferred collection of all factual data to highway district engineers with assistant district engineers in charge of traffic engineering and planning functions. With such practices being followed by some of the states perhaps this paper is not too visionary, and it is predicted here that one day there will be only one division of the highway department known as the Transport Division (or some other significant name) to correlate all functions of transportation now designated as "traffic engineering" and "highway planning."

An original article by H. A. Flanakin, State Planning Engineer, Department of Public Works, Baton Rouge, Louisiana.

SEASON'S GREETINGS TO OUR SUBSCRIBERS FROM THE EDITOR



Stop, Look and Listen

GOOD NEWS!

E. J. O'Meara, Director of the Institute and Wisconsin's one candlepower hunter, spent the deer season in St. Mary's hospital in Madison. There is no confirmation of the report that he brought home a nurse. He did well, otherwise, however, including the establishment of an air-tight alibi for not supplying the F & F Club with their all-too-infrequent venison dinner. We are all glad you will be home for Christmas, Ed.

CONGRATULATIONS

Maxwell N. Halsey, formerly Associate Director of the Bureau for Street Traffic Research, Yale University, assumed new duties on Dec. 1 as Executive Secretary of the recently established Michigan State Safety Commission at Lansing, Michigan.

Among the many functions of this Commission will be the study of traffic conditions and the establishment of a long-range planning program for safe automotive transportation.

Despite his heavy schedule Mr. Halsey will continue as chairman of the Defense Traffic Committee of the I.T.E.

Best wishes of all members of the Institute go to Max for success in his new position.

APPLICATIONS FOR MEMBERSHIP

Robert Walker Jackson
Traffic & Safety Engineer, Traffic & Safety Division, State Highway Department, Lansing, Michigan; (home address) 526 N. Foster Avenue, Lansing, Michigan.

Herman J. Hoose
Traffic Engineer, Police Department City of Mishawaka, Indiana.

EMERGENCY TRAFFIC ENFORCEMENT PROGRAM

The I.A.C.P. at a national meeting in Washington on November 14 launched an Emergency Traffic Law Enforcement Program and immediately followed through by holding meetings in each of its six districts. Meetings have already been held in New Orleans, Hartford and St. Paul and further meetings will be held on January 6, 16 and 27 at Dallas, Sacramento and Detroit respectively.

Governors, mayors, city managers, police executives, prosecutors, traffic judges and motor vehicle administrators from every state in each region take part, and an Emergency Five-Day Traffic Officers' Training Conference will be given.

Enforcement plays a vital and effective role in every successful safety program. Traffic Engineers need the support of the police and, in many instances, owe much to their untiring efforts. We therefore, stand ready to cooperate in every way possible to aid Enforcement Agencies in making a success of their Emergency Traffic Enforcement Program.

PREFERENCE ROADS

OPM has designated six classes of roads which may have preference of highway construction materials when and if shortages occur.

Application for priority assistance should be made by the state highway department concerned through the Public Roads Administration to the Project Section, Division of Priorities, Office of Production Management. If circumstances warrant, a Preference Rating Order will be issued assigning appropriate ratings to deliveries of materials.

The six classes of preference roads and their ratings are as follows:

September 4, 1941

CLASS OF PROJECTS AND RATINGS

1. *Access Roads*:
   a. Access Roads to Military and Naval Establishments — Preference Ratings of the Access Road Project shall correspond to the rating of the military and naval establishment served.
   b. Access Roads to Defense Manufacturing Establishments—Preference Rating of the Access Road Project shall correspond to the rating of the defense establishment served, except that the highest rating which can be assigned is A-1-c.

	Preference Rating
2. *Strategic Network of Highways*:	
a. All bridges, tunnels, structures and approaches	A-2
b. New roads or the improvement of substandard roads and grade separation structures	A-4
c. Shoulder widening and minor drainage structures	A-10
d. All other work	B-3
3. *Federal-aid Systems*:	
a. All bridges, tunnels, structures and approaches	A-3
b. New roads or the improvement of substandard roads and grade separation structures	A-7
c. Shoulder widening and minor drainage structures	A-10
d. All other work	B-3
4. *Federal-aid Secondary and National Park & Forest Projects*:	
a. Bridges and approaches	A-7
b. New roads or the improvement of substandard roads and grade separation structures	A-10
c. All other work	B-3
5. Projects for the construction of the Inter-American Highway in Mexico and Central America	A-3
6. Construction of the Trans-Isthmian Highway and the Chorrera-Rio Hato Highway in Panama	A-1-b

FOOD AND ACCOMMODATION

The British Road Federation feels that the problem of securing adequate food for long distance truck drivers is on the way to solution. A list of roadside establishments has been compiled on the advice of the drivers themselves. The Federation has gone farther and requested all firms which have terminal accommodations for their drivers to open these facilities to the drivers of vehicles calling at their depots.

Merry Christmas

and

Happy New Year

Gothard Manufacturing Co. - Springfield, Ill.

TRAFFIC PLANNING

Mr. Frederic A. Delano, chairman, National Resources Planning Board, Executive Offices of the President of the United States, in September 1941 submitted a traffic plan to the American Automobile Association which should be of interest to traffic engineers whose cities are laid out on the rectangular checkerboard system.

Briefly the plan is to make one north-and-south street and one east-and-west street in every three streets a *major thoroughfare,* while the intermediate streets would be *minor thoroughfares.*

Mr. Delano in proposing the plan for Washington, D. C., states, "You would have a north-and-south main thoroughfare street and on each side a parallel street for stopping and parking traffic. The main thoroughfare street would be crossed by traffic only at every third block, but at the intermediate blocks right-hand turns off or on to the thoroughfare would be permitted. These thoroughfare streets should be at least 6-lane streets. The outer lane would be for stopping traffic and for traffic turning in from other streets or turning off. No parking would be permitted on such street, but only stopping to take on or discharge passengers.

This operating program would concentrate the major traffic on one-third of the streets of the city leaving the other two-thirds to serve local traffic, stopping, standing, storage and distribution of vehicles.

SUPER REFLECTORS FOR SUPER HIGHWAYS

Grotelite Delineator Equipped with 3" diameter reflectors. Can be attached to any size angle post

The new Grotelite plastic reflector answers an old reflection problem, i.e., the need for a reflector possessing intense reflecting qualities at extreme angles. This new invention operates upon the principle of total reflection. Light incident upon the device is reflected back to the source through a fairly wide range of angles on one side of direction of approach but through a relatively narrow angular range on the other side. Grotelite reflectors are thus adapted to the actual conditions encountered along the highways.

They offer the distinct advantage in reflecting at great distances while still remaining visible almost up to the time the vehicle passes it. The entire reflecting area returns light even at extreme angles.

A small indicating arrow on the face of each lens points the direction to the road at which the reflectors operate at maximum efficiency. The front faces of the reflectors are smooth.

The delineators illustrated are streamlined and of extremely rugged construction.

Specify Grotelite reflectors for greater performance at minimum cost. Send for catalog.

Grotelite Bridge Signal or Delineator 3" dia. reflector

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THE GROTELITE CO., INC.

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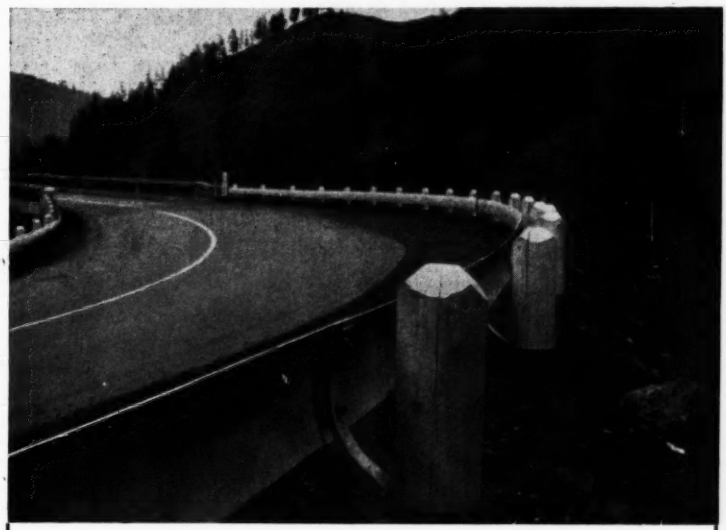

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DOWNWARD HIGHWAY FATALITY TREND

Last August was the first month since September 1940 to show a reduction in highway fatalities in Britain and gave impetus to the inauguration of an intensive highway safety campaign which is to be continued throughout the coming winter.

The annual pre-war average of highway fatalities in Britain was 6,500, the first year of the war 8,400 and the second 10,000.

In the first year of the war the problem was mainly one of more accidents to adult pedestrians.

In the second year the increase occurred mostly among passengers, people boarding and alighting from vehicles, motor cyclists, child pedestrians and adult bicyclists.

While fatalities alarmingly increased, injuries were substantially 25% below pre-war years.

The safety campaign will include stricter control of roads by police; better road repairs this winter; use of two masked headlamps instead of one; "Safety First" talks in schools; making of two films—one for adults and one for children; radio talks; poster and newspaper advertising.

British Road Federation, Nov. 1941

Control Army Traffic
with CATAPHOTE REFLECTOR BUTTONS

Today's armies march on wheels . . . in all kinds of weather, day or night! That's why National Defense needs safer highways . . . and Cataphote Reflector Buttons are ideal to help with this job! In training camp areas, install Cataphote Niteway Outliners to illuminate highways with a brilliant lane of beacons. They reflect only direct rays from headlights—thus for blackouts, these beacons tell no tales to aircraft observers. For *permanent reflection* . . . and *greater safety* . . . specify Cataphotes! Write for more facts.

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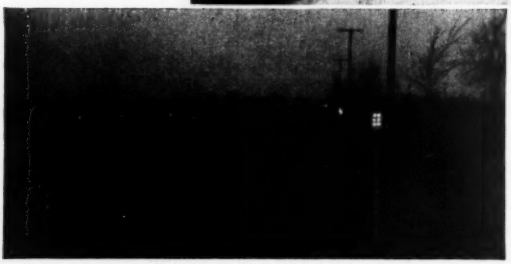
TOLEDO • OHIO



"BACKWASH" RIDES AGAIN

From the Rock Island (Illinois) "Argus" of November 21, 1916.

"Brakes on a delivery truck owned by L. S. McCabe & Co. slipped while the vehicle was left standing on the Fifteenth Street hill. The truck was damaged as it struck a curb to end its runaway journey."

And in an adjacent column:

"Mayor McConochie appointed a new traffic commission of City Attorney J. K. Scott, Traffic Officer William Fitzsimmons and T. B. Totten."

Bill McConochie comments "Grandpaw always was quick to recognize a problem and take action. Rock Island could use some of the spirit of '16 right now. Accidents in the first 9 months of 1941 placed it in 84th place among 96 cities of its size reporting to the Statistical Bureau of the National Safety Council. In fairness to Rock Island, however, it must be noted that they are presently staging an intensive "S" campaign to promote traffic safety." Happy New Year!

ENFORCEMENT DECREASES ACCIDENTS

Although Los Angeles' traffic has increased 30 percent in the past four months, there has been a small decline in the traffic accident rate due to the addition of 24 patrol cars and 108 motorcycle police.

These men and cars were added to the traffic department on the recommendation of the International Association of Chiefs of Police who had made a survey of the city, and found that 85 percent of the traffic accidents were caused by traffic violations.

Investigations are made of all accidents and the reports turned over to an "analytical unit" of the police department who, after careful study, recommend traffic engineering improvements.

DO YOU KNOW?

The City of Houston in a recent vote, voted a $100,000.00 bond issue for traffic control devices.

The Texas Highway Department is using a broken yellow dash stripe for no passing zones on a few selected highways in the state.

"Q" stands for the quicker turnaround of every type of vehicle that is needed to move war supplies in Britain to take care of the expansion of war industries.

Bicyclists in Britain are required to carry both a white patch not less than 12 square inches and an unobscured rear lamp at night.

PROGRESS IN ENGLAND

Mr. G. L. Pepler, Past President, Town Planning Institute in London, outlined the type of transport thinking the British are doing at present.

The British recognize that the congested cores of most cities are sadly in need of reconstruction. The necessary tour de force was lacking until many of these cores and their hidden architectural and historic treasures had been bombed.

Today the government has taken such an active interest that everyone assumes a central planning authority to exist which will formulate policies for transport, industry and agricultural development. National policies respecting the location of industry in respect to communication are being evolved to meet post-war economics and conditions.

Further legislation to permit thoroughfare planning on a large scale is being drafted.

Civic surveys covering facts and tendencies and possibilities are being assembled and correlated. In some instances plans in sufficient detail are being prepared to insure starting immediately upon cessation of hostilities on sound engineering principles.

(Eng. News-Rec., Oct. 1941)

"A 1941 ACCOMPLISHMENT"

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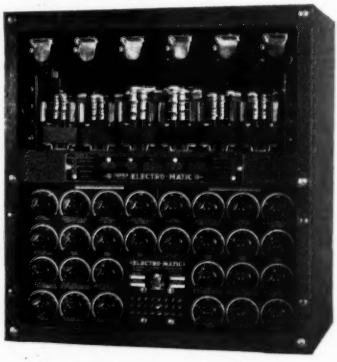
≡ *SUPER* ELECTRO-MATIC ≡



INTEGRATED TRAFFIC CONTROL

- *DENSITY-ACTUATED*
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BUENOS AIRES WAY

City Engineer, F. A. Zamboni of Buenos Aires, Argentina, writes in American City with pride concerning the two understreet garages with a capacity of 765 cars completed three years ago as part of a boulevard widening project which included the removal of an entire block width of old buildings for the entire length of five blocks.

Briefly, these two garages are 200 feet wide, 15 feet high—one 400 feet long, the other 800 feet.

Mr. Zamboni recommends 2-lane access ramps with 11 feet lanes on either side of the street instead of the 3-lane ramps first designed.

These garages are self-liquidating through a 15 cent parking fee and rents from sales rooms, repair shops, and poster advertising.

The results have been so satisfactory that it is hoped to provide accommodations for 6,770 cars by extending the boulevard widening and by planning several two-story underground garages.

CONSERVING METAL AND MONEY

Several states are adopting devices eliminating the need for new automobile license plates in the future. California estimates that their method of fastening cover strips on existing plates will save between $100,000 and $130,000 in addition to conserving metal. Delaware will use permanent plates with inserts showing month and year. Kentucky is considering a 5-year plate with different colored windshield stickers to indicate the year. Michigan will attach a steel strip denoting year similar to the Connecticut method. Thought is being given to plastic plates.

EXPRESS HIGHWAYS

"Express Highways — How They Serve Millions of Motorists" by the Portland Cement Association poses several searching questions pertinent to traffic officials. It opens with "The Express Highway has become an economic necessity where heavy concentrations of motor vehicles must be handled," and continues with the thesis that highways in congested areas do not have the "capacity for steady flow of large volumes of traffic," that "traffic volumes have increased much more rapidly than highway facilities have been developed" and that "widened streets with traffic light systems in many cases have failed to solve the problems." Public officials are urged to develop a planned system of express highways.

The pamphlet takes one on a picture tour of some of the nation's outstanding parkways and freeways. The motor mileage by 1960 is estimated at double the present 300 billion miles a year and vehicle registrations will rise to 40 million. The expansion of motor transportation is held back only by lack of highways and street capacity to accommodate more vehicles.

The express highway is likened to elevated and subway lines of the mass transportation system. It is defined as a thoroughfare with opposing streams of traffic separated with grade separations eliminating *all or a large part* of cross-traffic, and with controlled entry and exit points and other facilities (control of abutting land uses, for example) in varying degree for permitting large numbers of vehicles to move steadily and safely. The value of the express highway is *not primarily in higher speeds*, but rather in the continuous flow of traffic.

Local traffic is handled on service roads which may enter and leave the express road at designated points. These highways are needed between cities, through and around metropolitan areas, to and from business and residential districts for "rush hour" traffic, to and from municipal airports, near large industrial plants and terminals, adjacent to military reservations and ordinance plants, and out from metropolitan centers to beaches, lakes and recreational areas.

Safety is emphasized by citing the Outer Drive in Chicago, which in 7 years has carried 140 million vehicle-miles of traffic with only 2 fatalities. Capacity and steady flow advantages are demonstrated from Donald M. McNeil's (mem. I.T.E.) estimate of a $3,000,000 time loss annually in downtown Pittsburgh and the study conducted by Prof. A. J. Bone of the Mass. Institute of Technology in downtown Boston where as much as 118 per cent more gasoline per vehicle-mile was used on congested streets than on thoroughfares where a steady pace could be sustained. Capacities and other valuable data for several freeway structures are given. The Henry Hudson Parkway was given as carrying approximately 50,000 cars daily in and out of Manhattan, N. Y.

These highways not only generate much traffic but also spur orderly community development and business growth. A parkway through a blighted area not only arrests slum trends and boosts property values but also stimulates business.

A 400-mile system of express roads, parkways, tunnels and bridges is rapidly nearing completion as part of the Thoroughfare Plan of the Master Plan for the New York Metropolitan region.

Editor's note: These highways must be driver and vehicle designed. Strength and durability of materials are recognized, but Traffic Engineers would be derelict in their duty should they permit ossified opinions to exclude the incorporation of basic traffic engineering features within the structure.

Traffic Planners must recognize the

From Every Angle...

The Simplest Timer of Them All

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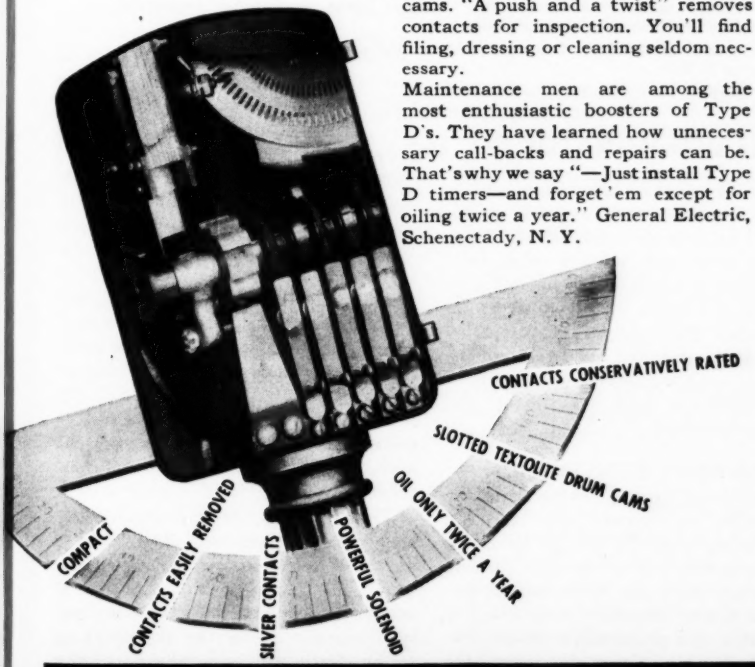
WHY NOT have simple, positive control of contact opening and closing when it costs you nothing extra? Type D timers translate electric impulses from the dial-key contact into straight-line motion to advance the drum cam one position. Color sequence *can't* get out of adjustment. What's more, color sequence can be changed in a few minutes to meet new traffic conditions by slipping on different cams. "A push and a twist" removes contacts for inspection. You'll find filing, dressing or cleaning seldom necessary.

Maintenance men are among the most enthusiastic boosters of Type D's. They have learned how unnecessary call-backs and repairs can be. That's why we say "—Just install Type D timers—and forget 'em except for oiling twice a year." General Electric, Schenectady, N. Y.



GENERAL ELECTRIC

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TRAFFIC COUNTING SIMPLIFIED WITH NEW TRAFFIC COUNT DENOMINATOR

Illustration of 3 unit Counter, classifying directions of travel

Other models with from 1 to 12 classified counting units mounted in horizontal line.

By simply pressing key one count is recorded in classified counting unit controlled by that key.

Touch method employed permitting operator to keep eyes on road at all times.

Quick reset returns all counting units to zero.

Counting units may be classified to represent direction of travel, different types of vehicles, state license plates, and other important classifications in traffic planning.

Now in use by City, County and State Highway Departments throughout the U.S.A.

Quick . . . Accurate . . . Efficient.

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THE DENOMINATOR CO., Inc. - 261 Broadway, N. Y. City

related factors of standards of living, future taxes and benefits other than those factors which are normally translated into a dollar and cents yardstick. Terminals for vehicles are of equal importance and road builders, shippers, officials and the general public must be encouraged to think realistically and comprehensively.

IMPROPER REGISTRATION

The owner of a car overstaying the limitation for visitors may be liable for damages should his car be stolen and be involved in an accident causing a fatality ruled the Massachusetts Supreme Court recently in ordering a new trial to a policeman's widow who lost her Superior Court suit against the owner of the car which killed her husband while being driven by an automobile thief.

"GIVE COURTESY FOR CHRISTMAS!"

The N.S.C. in launching the Christmas phase of the Nationwide Emergency Safety Campaign called by President Roosevelt is offering this slogan: "Give Courtesy for Christmas!" It stresses giving other drivers and the pedestrians a break and being patient with the mistakes and boorishness of others.

Traffic deaths are running 17 per cent ahead of last year. December is normally the deadliest month of the year. The N.S.C. points out that if courtesy is coupled with the convivial spirit of the season the skyrocketing traffic death toll will take a definite slump. The editors recommend to Traffic Engineers the N.S.C.'s Christmas Courtesy Cocktail.

AFTER DEFENSE—WHAT?

Our greatest resource is men at work. Full employment is the key to national prosperity. In this world of growing economic interdependence the individual can produce little working alone. Thus cooperative mass action must assure full employment.

In this time of crisis, we must take stock of the problem of full employment which we shall face again when this war is over.

Within two to three years every available person will be at work unless Germany collapses and threat of aggression against us is ended.

At the present rate of up-building the United States in 1944 will be absorbing the energies of about 23 million workers in war industries and 3½ million in the armed services. Turning from defense to peace will involve transferring from 23-26 million men back to peacetime activities.

The depression and recent defense production has shown that a balancing of the production-consumption budget can be achieved as during the depression by a great deal of unemployment, inefficiency and suffering or as now by full employment, high efficiency and a better life for all. In other words, the central problem is not money, it is manpower, resources and organizing ability.

The 60 million people who will be employed in 1944 will be producing 105-110 billion dollars worth of goods and services. During the depression our national income slipped back to 70-60 billion dollars a year.

The great problem we face when the war ends is to move over from a system of full employment for defense to a system of full employment for peace without going through a low-employment slump. This will require a cooperative program with the government playing a leading part.

The National Resources Planning Board sets forth the following outline of a post-defense program for thought and discussion.

Primary Objectives:

Stabilize on a national income of 100 billion dollars.

Maintain wage standards with 40 hour week and 50 week year for workers.

Relieve from work the aged if they wish, women who choose to be in the home and youths who should be in school.

Decentralize post-defense emergency activities.

Encourage free enterprise to advance cooperatively under governmental leadership.

Enable every American to obtain adequate food, shelter, clothing, medical care, education and opportunity to advance.

Achieve through construction activities an increase in National Estate.

Insure the basic freedoms of American life to every human being within our boundaries.

The foregoing objectives are to be realized by a planned demobilization in line with available jobs, a gradual liquidation of defense contracts with peacetime contracts and federal, state and local public works programs integrated with expansion and encouragement of industry and service activities.

Long-term "Capital Budgets" coupled to projects now being assembled within the Federal Works Reserve will form part of the structure for large-scale rebuilding of our cities.

Certainly the post-defense period will see new and far reaching improvements and additions to our transport facilities.

Our foreign policy will also have a bearing upon our domestic employment program. Through an extension

of lend-lease we shall help feed the peoples of Europe until they are on their feet. This will require roads, trucks, gasoline and manpower. Further aid will be forthcoming after this by assisting in rebuilding of European facilities so that the buying and trading power of these peoples and those of Asia can cooperate with our domestic resources and manpower to promote prosperity, increase living standards and elevate human dignity everywhere.

Condensed from National Resources Planning Board publication "After Defense-What?" Executive Office of the President of the United States, August 1941.

GASOLINE SUBSTITUTES

Brazil: Lack of ocean transport for securing gasoline from the U. S. has necessitated a law requiring owners of 10 or more buses and trucks to use gas obtained from burning wood or charcoal for operating a tenth of their vehicles. Alcohol from cane sugar is also used.

Australia: Fuel from wheat, sugar and molasses, rectified spirits, methane gas and Benzol cover one-sixth of present consumption. In New South Wales the laying up of 82,000 cars will cause a loss of $64,000,000 in gas tax revenue.

New Zealand: Overlapping milk routes will henceforth be served by one firm.

Japanese-controlled Nanking: Private cars, taxis and trucks have been cut 50% in gasoline supplies. Buses and oil trucks are exempted.

Italy: Civilian automobiles have only methane or charcoal gas for propulsion.

Britain: Private cars are limited to 100 miles of travel a month. Commercial vehicles receive 29 gallons a month for each ton up to four tons.

Canada: Each dealer was allotted 75% of the amount of gasoline he sold in July. A 7 P.M. - 7 A.M. curfew is in effect and only two grades of gasoline sold.

POST-WAR ARMY VEHICLES

British motor vehicle manufacturers plan to repurchase surplus army vehicles both now and after the war at fixed prices based on age and model. The vehicles will be reconditioned and distributed to dealers who will resell for civilian use.

FINANCIAL RESPONSIBILITY

Liability insurance for the automobiles of all officers, enlisted men and permanent civil employees has been made an order by Captain Andrew C. McFall, Commandant of the Quonset Naval Air Station in Rhode Island, before these men will be given special license plate tags denoting their connection with the station.

ON THE SHELF

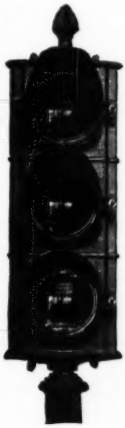
PROCEEDINGS OF THE FIRST MINNESOTA ENGINEERING CONFERENCE, 1941. Sponsored by the Center for Continuation Study, University of Minnesota in cooperation with the Minnesota Department of Highways and the League of Minnesota Municipalities, 136 pp.

PORTSMOUTH AND NATIONAL DEFENSE, The Portsmouth Herald, Portsmouth, N. H. 95 pp. A series of articles published in the Portsmouth Herald and reprinted in book form.

PROCEEDINGS OF THE AMERICAN SOCIETY OF CIVIC ENGINEERS, 1941, 33 West Thirty-ninth Street, New York, N. Y. 191 pp. (The first of two parts.) Contains technical papers and discussions.

ADJUSTABLE FACE TRAFFIC CONTROL SIGNAL HEAD STANDARDS, Technical Report No. 1, 1941, Institute of Traffic Engineers, 60 John Street, New York, N. Y.

ELECTRIC SIGNALS



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When signs are not enough or expense is a factor, reflector signals keep down both cost and accident rate.

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Large Stimsonized and standard reflector button signs for all traffic conditions.

72" SIGN
18" LETTERS

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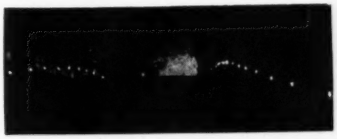
DELINEATORS

Reflector Delineation gives essential road information after dark at daylight distances. The alignment and driving limits of the road are outlined by a channel of light.



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The new "Eaglelux" signal is of die formed steel construction—rust proofed by Government approved process. This construction retains all of the outstanding exclusive features of the "before defense" type units.

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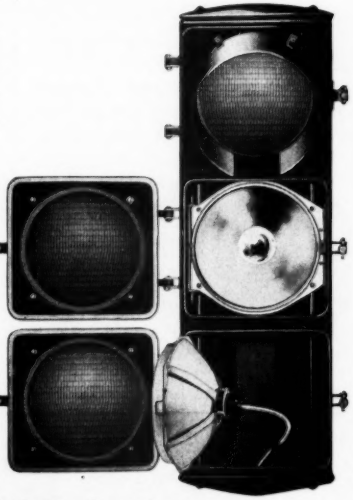

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PIERCING FOG

That yellow light is no better at piercing fog than the light of an ordinary tungsten lamp is shown by experiments recently carried out by Dr. Matthew Luckiesh, research physicist and Franklin medalist, and L. L. Holladay, of the Lighting Research Laboratory of the General Electric Company, Nela Park, Cleveland, and reported in the Journal of the Optical Society of America.

The so-called fog-lamps, consisting of yellow lenses which absorb 20 per cent to 35 per cent of the tungsten-filament light must contribute something to the seeing to offset the loss due to less light. No satisfactory tests have been published, but the present investigation makes it more than unlikely that they have any advantage. Similar fog-piercing claims have been made for the new sodium lamps. In this case there is no loss of light by colored filters, for the light is inherently yellow and practically monochromatic. Yet even this lamp showed no significant superiority over the tungsten lamp in fog-penetrating qualities.

The two lamps of equal intensity were tested side by side in clear weather, moderate fog, dense fog, mist and snow. They were tested by day and by night. Also a pair of lamps of low density and a pair of high intensity were used. Many experienced observers made many readings on a Luckiesh-Moss visibility meter at a distance of 1,000 ft. No significant differences showed in the averages.

The report explains that the fog-penetrating power of a light does indeed depend on its color or wave-length, as has been generally known. Thus blue light, which is of short wave-length, penetrates fog less than red light, which is of long wave-length. The sodium lamp emits yellow light that is practically of a single wave-length. This wave-length is about midway between those of the red and blue lights. Hence the fog-penetrating power of the sodium light is just about middling.

The white light of the tungsten filament contains all the colors from red to blue. It is true that the blue rays are cut down by the fog, but the remaining red rays have a fog-penetrating power superior to the yellow light of the sodium lamps. This evens the score.

Science, New Series, Vol. 94, No. 2436, p. 10, September 5, 1941. Highway Research Abstracts, November, 1941. Submitted by Kirk N. Reid.

LOWELL, MASS. BY-PASS

The first link of a Boston and New Hampshire six lane divided highway was completed last August to by-pass Lowell, Mass. A 500 ft. right-ofway was acquired to discourage encroachment. This by-pass is part of the nation's strategic highway network and was used a few hours after opening by army motor convoys avoiding the congested streets of the city.

Although this section is only 4½ miles in length it cuts off 1½ miles of city travel and relieves congestion on Mass. State Route 4.

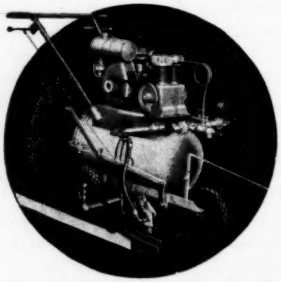
The 500 ft. right-of-way was acquired largely through undeveloped territory. Massachusetts does not yet have a limited-access highway law to afford protection, thus the 500 ft. right-of-way. Because access cannot be restricted by the state highway department, some minor roads will enter the highway at grade. Major intersections will be separated.

Plans called for two 34 ft. roadways separated by a grass median strip from 8-20 ft. Each roadway consists of two 12 ft. lanes and a 10 ft. parking lane. The cross-section shows a six-foot sidewalk on one side separated from the roadway by a four ft. grass panel set into the 14 ft. shoulders.

Speed up HIGHWAY MARKING

STRIPE UP TO 15 MILES OF HIGHWAY PER HOUR

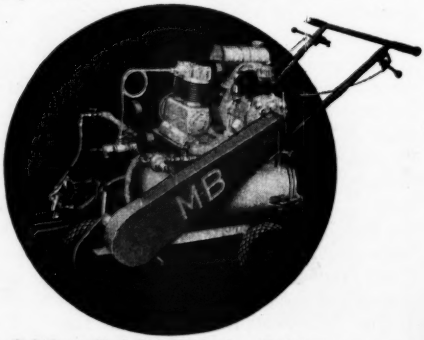
The M-B Automatic Marker (shown above) can handle EVERY type of traffic line marking job. Stripes center lines and "no passing" lines—single, double or triple—solid or intermittent—one color or two colors—in any desired combination—and it does the job accurately and safely. Assures uniform, clean-cut lines. No "mist." Saves 15% to 20% of material, compared to other methods of marking. Write for Bulletin No. 113.



Standard M-B Hand-Propelled Street Marker

STREET MARKERS

Compact, versatile machines for all types of traffic striping jobs: Center lines, parking areas, cross walks, safety zones, etc. Can also mark athletic fields, airports, tennis courts, playgrounds, etc. Quickly convertible to all-purpose paint sprayer. Easy, one man operation. Write for Bulletin No. 112.



Self-Propelled Street Marker that lays down traffic lines up to 15,000 feet per hour.

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Note: Kindly insert in your copy of the roster.

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CONDREY, M. CLYDE, Assoc.
Assistant Traffic Engineer, Department of Public Utilities, City of Cincinnati, Ohio

HOLMES, ROBERT S., LIEUT., Jun.
Instructor, Provost Marshall-General School Arlington Cantonment, Virginia

MACK, IRVING, Assoc.
Assistant to the President, American Gas Accumulator Company, Elizabeth, New Jersey

MORIARTY, JOHN B., Assoc.
Traffic Engineer, State Highway Commission of Indiana, State House Annex, Indianapolis, Indiana

REX, CHARLES H., Mem.
Special Representative, General Electric Company, 840 South Canal Street, Chicago, Illinois

SCHWENDIMAN, GLENN, Jun.
Assistant Traffic Engineer, 7417 North Damen, Chicago, Illinois

TILDEN, CHARLES J., Mem.
President & Managing Director, Eno Foundation for Highway Traffic Control, Saugatuck, Connecticut

UPHAM, CHARLES M., Jr., Jun.
Traffic Analyst, Department Vehicles & Traffic, East Administration Bldg., New Municipal Center, Washington, D. C.

WELSH, JAMES W., Mem.
Engineer-Manager, Transit Research Corporation, 292 Madison Avenue, New York, New York

WETZEL, EDWARD G., LIEUT., Assoc.
On leave, Assistant Traffic Engineer, State Highway Commission of Indiana; at present, Assistant Executive Officer, Traffic Control Section, The Engineer Board, U. S. Army, Fort Belvoir, Virginia

INSTITUTE OF TRAFFIC ENGINEERS

January - 1942